Barnes

THE NEW ENGLAND Journal of Dentistry.

CONDUCTED BY ASSOCIATED DENTISTS.

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In the December number of the New England Journal of Dentistry is an article by Dr. E. S. Davenport, entitled "The Bioplasson Doctrine and its Critics," which professes to be a review of a paper of mine in the Dental Cosmos for August last.

The substance of my paper is as follows: I first describe Dr. Heitzmann's "Bioplasson Reticulum" in a way which seems to have been satisfactory to him. I then quote his method of seeing it. He says:

"Add to a drop of fresh blood a small drop of a forty per cent. solution of bichromate of potash. This will within one hour extract the hemoglobin, and you must succeed in seeing the reticular structure in each red blood-corpuscle." . . .

"Take a drop of pus, fresh, without adding anything, and you will see the wonderful structure in each pus-corpuscle *with great ease*."

"In the perfectly fresh blood you will see the structure in each colorless blood-corpuscle."

The objectives required were "a first-class one-tenth immersion."

According to the directions, I added a forty per cent. solution of bichromate of potash to blood, and examined the red corpuscles. But they had become so shrivelled and distorted that I was unwilling to accept the appearances seen in them as evidence of actual structure.

In the pus-corpuscle and white blood-corpuscle, the reticulum was seen distinctly when the cover adjustment was wrong, but disappeared when it was set right. The corpuscles then appeared full of fine granules, with nothing visible between them. The best homogeneous immersion glasses would not show the net-work at all.

I had sent drawings and descriptions of these appearances to Dr. Heitzmann. He replied: "You draw everything in and out of focus; you should draw only what is clear and sharp in ONE focus."

I insisted "that the only proper and honest way to draw, is to draw everything exactly as you see it, without any change at all."

The paper was illustrated by several of my own drawings; three drawings of the net-work, by Dr. Heitzmann himself, from Dr. Elsberg's paper on the blood; and one drawing of a white blood-corpuscle, from Klein's Atlas of Histology.

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I spoke of a well-known fact in optics that round bodies placed close together produced the appearance of a net-work of hexagons, especially if the bodies are not distinctly seen. As an illustration of how liable even skilled observers are to be deceived by such an illusion, I referred to a well-known discussion on the structure of a certain test object. This object was, at first, supposed to be covered with a net-work of hexagons. Further investigation showed that it was composed of little beads joined together so as to form a plate, and that the net-work was only the imperfectly seen interspaces be-

tween the beads. But the error had been so firmly fixed in the minds of many that they clung to it until long after repeated demonstration had convinced all unprejudiced observers of its falsity.

I also referred to another structure called *amphipleura pellucida*, which is used as a test for the microscope. "This shell is marked with lines $\frac{1}{8000}$* of an inch apart. When it was shown that these lines had wavy edges, which gave them an appearance somewhat like that of a rope, one of the most difficult of feats was thought to have been accomplished. From this appearance and the analogy of other similar structures, it was *inferred* that the lines were rows of beads. Beads, then, $\frac{1}{8000}$ of an inch in diameter, are almost beyond the border of microscopic visibility."

I estimated from the well-known size of a white blood-corpuscle, about $\frac{1}{3500}$ of an inch, that Dr. Klein's figure was magnified at least two thousand diameters. "The meshes in Dr. Heitzmann's drawings are not less than five or ten times as large as in Dr. Klein's. If we may judge from these facts, then, Dr. Heitzmann's figures represent objects magnified *ten or twenty thousand diameters!* Let us look at these figures a little."

"The nodal points at the intersection of the lines are largest in the drawing which represents the net-work as contracted. In this drawing, the nodes are about one-fourth of an inch across. If we suppose the figure to be magnified twenty thousand diameters, the real size of the bodies would be $\frac{1}{8000}$ of an inch. But, not to press matters, say it is magnified only ten thousand diameters. This would give the bodies a size of $\frac{1}{4000}$ of an inch. Such bodies might be seen without excessive difficulty with a good high-power glass. There are, however, some other difficulties that we may consider."

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Dr. C. A. Brackett, of Newport, R. I., read the annual address.

Dr. D. F. Whitten, of South Boston, read an essay on "Treatment of Devitalized Teeth."

Dr. D. D. Smith, of Philadelphia, read an essay, "Discrimination in the Use of Filling Materials."

ELECTION OF OFFICERS FOR 1883.

President, Dr. F. Searle, Springfield.
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Second Vice-President, Dr. D. M. Clapp, Boston.
Secretary, Dr. W. E. Page, Boston.
Treasurer, Dr. E. Page, Charlestown.
Librarian, Dr. R. R. Andrews, Cambridge.

Executive Committee.

Dr. D. F. Whitten, South Boston.
Dr. F. E. Banfield, Boston.
Dr. J. S. Hurlbut, Springfield.
Dr. J. F. Adams, Worcester.
Dr. Leon Rideout, Lynn.

Voted, That Dr. J. T. Codman read his essay, "Reminiscences of the Society," at next meeting.

Dr. W. E. PAGE, *Secretary.*

We are kindly furnished with the following

OBITUARY.

Dr. Amos Johnson, the oldest dental practitioner in the city of New York, died December 10, 1882, at his late residence, 239 West Thirty-Eighth street. The services, which took place on the 12th ult., were largely attended by professional friends. Interment was made at Woodlawn cemetery.

Dr. Johnson was a graduate of medicine, which he practiced successfully in connection with dentistry. During his busy professional career he found time to write, and he leaves a large amount of unpublished manuscript, which he intended to have published in book form, it being the culmination of his long life-experience, study and investigation.

Dr. Johnson was an example of the Christ-spirit; the latter part of his life was mostly spent in "going about doing good." He was a genial and true friend, and lived a life without spot or blemish. His meek and lovable disposition endeared him to all who knew him.

P.

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inch, and twenty interspaces of the same size, would be somewhat crowded in a space of $\frac{1}{2000}$ of an inch."

"In the drawing showing the net-work in a relaxed condition, the nodal points are only one-sixteenth of an inch across. Here we are in a much better condition as regards room, but there arises another serious difficulty. If we still suppose that our corpuscle is magnified only ten thousand times, we shall have here a body $\frac{1}{160000}$ of an inch across, about one and three-fourth times smaller than those beads of *amphipleura pellucida*, which are so small as never to have been clearly seen."

"Again, the widest of the lines which connect these nodes are less than the thirty-second of an inch across, and the narrowest much less than this. Does he really expect us to believe that he, or any one else, can see lines less than $\frac{1}{320000}$ of an inch across, and lines, too, exceedingly pale, and imbedded in a mass of tissue like them in color and appearance?"

My views had been considered by a large number of microscopists of eminence, every one of whom agreed with me, if he expressed any opinion at all. The American Society of Microscopists had, at their meeting in 1881, considered them favorably.

I concluded by saying that, as the lines in the net-work had been shown to be so fine as to be invisible, and, as an optical illusion resembling the net-work was easily produced, I considered that I was justified in my opinion that the net-work was an optical illusion.

Dr. Davenport's article opens with a discussion of inventors and discoverers; then follow some personal observations about myself, and then a panegyric upon Dr. Heitzmann. On the fifth page of the article (page 389), he says: "From the perusal of Dr. Curtis' article in the August Cosmos, one would quickly conclude that of the three 'R's,' he takes the most delight in '*Rithmetic*, and while evidently believing the old adage, 'figures do not lie,' seeks to prove by their infallibility that diagrams *do*. While taking strong exceptions to that part of Dr. Curtis' article which insinuates against the honesty of Dr. Heitzmann, the writer of this report passes it without comment." . . .

"That Dr. Curtis should 'laugh to scorn' the diagrams drawn by Dr. Heitzmann to illustrate his writings, when in Germany he was considered one of the best and clearest artists in that line, and was much sought after to illustrate many noted standard works." . . Then follow some personal observations not necessary to quote.

"He counts the lines of living matter represented in one of the

diagrams, also the interspaces, the sum of which he multiplies by the width—per linear inch—of each line and interspace, divides by the number of diameters which he supposes the specimen to have been magnified, and his conclusion gives him so large a corpuscle that he says at once: 'This diagram is faulty, is made to order;' hence Heitzmann's bioplasson reticulum is not present! Does Dr. Curtis expect diagrams drawn off-hand to represent, as if they were photographs, lines and interspaces absolutely correct as to number and positively accurate as to their width, even to the thousandth of an inch?" . . .

. . . "He asserted at the meeting of the American Society of Microscopists, at Elmira, last August, that the reticulum, or something like it, must be present to account for the contraction, extension, etc., of the living matter, but that he could not see it, which certainly seems to be sensible talk."

Dr. Heitzmann had attempted to answer my first paper by saying, in effect, that I disbelieved in the net-work because I did not know how to use the microscope well enough to see it.

Dr. Davenport quotes this answer, and says: "The above would seem to be a sufficient answer to the assertions of a comparatively non-distinguished microscopist, unsupported as those assertions are by any well-defined explanations, or the corroborative evidence of men of note."

The short remainder of the article does not relate to my paper, and I will pass it by.

The above I believe to be all in Dr. Davenport's article, aside from the personalities, that bears on the point at issue.

The two papers are now, in substance, before us for comparison. Every candid person will, I think, agree with me that I have not been fairly represented.

It is said that I disbelieve in the net-work solely because I have not seen it, and that my objection to it is not sound because others have seen it. If such were the ground of my objection, there might be some justice in the exception against it. But a glance over my paper will show that I base my objection on something quite different. I have seen appearances exactly like what Dr. Heitzmann figures, and have given what I consider the only possible explanation of the cause of the appearances.

I regret that Dr. Heitzmann seems hurt at what I say about his criticism of my drawings, but I must maintain that my view is correct.

For scientific purposes, one must draw an object exactly as he sees it; no change, whatever, is allowable; even diagrams are to be used sparingly, and should be accompanied by accurate drawings. Any other course leads to endless confusion and misstatement.

The part beginning, "That Dr. Curtis should 'laugh to scorn,'" etc., plainly misconstrues my meaning. My object was not ridicule, but to show that the lines represented in the net-work were so fine as to be invisible. If the argument is too complex, it may be made simpler. A glance at Dr. Klein's figure will show that, if we include the nuclei, there are about thirty spaces in its diameter.* If we call a white corpuscle $\frac{1}{2000}$ of an inch, the spaces cannot average more than $\frac{1}{60000}$ of an inch across. Will Dr. Heitzmann, or any of his friends, estimate the width of the lines inclosing these spaces?

I had supposed that the mere mention of the name would be sufficient to remind one who claims to be a leader of microscopic thought, of Professor Abbe's demonstrations. But it seems necessary to expand the hint. Professors Abbe and Helmholtz both showed, years ago, by mathematical demonstration, that the finest lines, visible by direct light, were about $\frac{1}{90000}$† of an inch. With the utmost of obliquity, under certain exceptional conditions, it was theoretically possible to distinguish lines $\frac{1}{120000}$‡ of an inch. Since the introduction of homogeneous lenses, this limit has been extended, and it is now theoretically possible, with the extreme of obliquity, to separate lines $\frac{1}{148128}$ of an inch; but this is the extreme of theoretical limits and will, perhaps, never be reached.

These conclusions are accepted by mathematicians, and Dr. Heitzmann might as well quarrel with the multiplication table as with them. And yet, he asks us to believe that he can show lines in the white blood-corpuscle the thickest of which are less than the $\frac{1}{300000}$ of an inch in width.

Dr. Davenport objects to my criticism of these drawings. They must be treated tenderly, because they are "diagrams drawn off-hand." But they were offered as an illustration of what was seen, and as proof of its existence, and it is absurd to claim that, because they are diagrams, they are not subjects for criticism. Observe that I do not

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*The nuclei were not included in the former enumeration of the spaces.

† More exactly $\frac{1}{3636}$ mm., or $\frac{1}{92000}$ of an inch.

‡ $\frac{1}{4848}$ mm., or $\frac{1}{122000}$ of an inch. These figures are from Professor Helmholtz's article, first published in Poggendorf's Annalen for 1874.

insist that the lines shall be "absolutely correct as to number and positively accurate as to their width, even to the thousandth of an inch." I allow plenty of lee-way, but I do demand that they shall represent objects possible to be seen. And I have shown that they represent objects impossible to be seen.

I would also call attention to an inaccuracy in this paragraph. The sentence, "'This diagram is faulty, is made to order;' hence Heitzmann's bioplasson reticulum is not present!" is in quotation marks. Quotation marks imply a reproduction of the words another uses. I have neither used such words, nor do they represent correctly the meaning of anything that I have said, as may be seen from what has gone before.

The writer is also misinformed as to the words I am said to have used at Elmira last August. I neither there nor elsewhere have ever said, or believed, that the presence of a net-work is necessary to explain amœboid motion. The net-work was, indeed, discussed at the meeting, but although it was an extremely interesting subject to me, I took no part in the discussion. Many said that they had been studying the subject but, with two exceptions, all who spoke agreed with my published views. One of these exceptions was a student of Dr. Heitzmann's. He said, in a very hesitating way, that he had seen the net-work occasionally, but he made no attempt to answer the objection that it might be an optical illusion. The second of these exceptions thought there ought to be such a thing, for it made a very pretty theory, etc. He thought, but was not quite sure, that he had seen it while studying the subject with another member of the society who was present. The other member referred to was a much more practiced observer than the former. He said most emphatically that the net-work was not to be seen at that time. One speaker had been shown the net-work by Dr. Heitzmann, while a student in his laboratory, some years ago, but had never been able to see it in his own laboratory. The same gentleman afterwards told me that he had always regretted that a disinclination to disagree with a teacher older and more experienced than himself, and one who was, besides, impatient of contradiction, had induced him to appear to accept what he never has believed. The president of the Society was shown the so-called net-work by Dr. Heitzmann while visiting him in his laboratory. Being a guest, he disliked to say that he thought the objective was out of adjustment and the appearance an illusion. At home, he found that, by putting his objective out of adjustment, he could see

exactly the same thing as in the laboratory; this disappeared when the objective was set right. He was certain, therefore, that the net-work was an illusion. At the meeting of the American Association for the Advancement of Science, Dr. Elsberg read a paper on the net-work, which met with a similar disapproval.

The whole of my argument answers the last quotation from Dr. Davenport, except the personality. For "explanations," I have shown that it is natural to expect an optical illusion just where the net-work is said to exist. I have shown that such an illusion can be easily produced. I have shown that some of the structures said to show the net-work were so altered by chemicals as to be useless for any such purpose. I have shown, finally, by indisputable optical laws, that the lines said to make up this net-work are far too fine to be seen with any microscope.

It would seem that this is "well" enough "defined" to satisfy any one. And, when the theory is repudiated by two of the most prominent scientific bodies of this country, and by the great body of microscopists, including, to my certain knowledge, some of his own students, I think I have "corroborative evidence" enough "of men of note."

These objections have nowhere been met. Instead, the attempt has been made to sink out of sight those arguments which seemed to tell the most against the theory. Others, I am sorry to say, have been misrepresented, I hope unconsciously.

The personalities I shall not answer. They were probably the hasty ebullitions of an excess of wit, which mature reflection would have omitted.

In conclusion, I would say that, until I am answered by something far better than has yet appeared, I shall consider that I have proved that this net-work in the pus-corpuscle and in the white and red blood-corpuscle, at least, is only an optical illusion.

LESTER CURTIS.

1558 Wabash Avenue, Chicago, December 28, 1882.

"WE ALL LIKE SHEEP HAVE GONE ASTRAY."

BY DR. WM. H. ATKINSON, NEW YORK.

Read at the Annual Meetings of the American Academy of Dental Science, and Connecticut Valley Dental Society, October, 1882.

This saying is verified in society by the prevalent habit of following leads without due examination as to whither they tend. In no case is it more common than in popular instructions to secure and maintain health of body and peace of mind. Soundness of body is essential to clear and regular mental exercise, and this is requisite to proper performance of bodily function. A sound mind in a sound body is the example of health to which all are invited. But what constitutes the soundness is not so well defined. One set of inquirers maintain that man was created perfect and fell away from soundness of organization, inducing suffering and death. Another set assert that man has never attained perfection of structure and wholeness of function, but is approaching it through his surroundings. Whether pain and misery be the offspring of the one or the other hypothesis, the fact remains that there is no extant example of complete harmony of function on earth among men, savage or civilized. Civilization has been the bane and also the blessing of the human race.

So far as density of population is concerned, savage races can only survive upon a territory large enough to afford them food by the capture of wild animals which belong to wild countries, and such vegetables as grow spontaneously therein. Domestication of Plants and Animals tends to their multiplication by reason of protection from their natural enemies. Savages who eat unprepared foods wear their teeth out very fast, and therefore do not live as long as civilized people who lessen the wear of the teeth by fine division and cooking of their food. So long as bodily completeness depends upon food supply, the necessary quantity must be forthcoming, or lack of the whole body, or some part thereof, will initiate incompleteness or inharmony of the functions of the body or mind, or body and mind—which in turn introduces disease by starvation, which, if continued, results in death of the body. Adaptation of food to feeder, or, as it is called, quality of food, is a prime factor in securing perfect digestion.

Feeders are of three classes: Carnivorous, Vegetarian, or Omnivorous in constitution.

Carnivora bolt their food, and the digestory apparatus fluidifies it into pabulum for assimilation.

Vegetable-feeders must comminute grasses, grains and fruits, so as

to make them amenable to solution in the very complicated apparatus for digestion belonging to this class of feeders.

Omnivora have a digestory apparatus, which is a compromise between the simple and short intestines of the Carnivora and the involved, complicated and long alimentary canal of the vegetable-feeders.

The teeth are the best index by which to classify feeders. Carnivora have teeth adapted to catching, holding and tearing their prey.

Herbivora have teeth adapted to collecting, cutting off and finely dividing the various articles upon which they live.

Omnivora have teeth adapted to cut, tear and grind into a pulp their food, thus presenting us with a means of classification at the very entrance to the digestive tract.

According to this discrimination, man belongs to the Omnivora. Savages, as a rule, devour their food without any or with little preparation or cooking. Civilized races invariably prepare and cook their food more or less, thus doing part of the work of digestion and of the digestory organs, which savages charge their internal apparatus with doing unaided. The way in which the importance of the teeth became known to mankind was through their loss or disease, by neglect or abuse—the former being the initiative and chief factor in the imperfect development and mal-arrangement of the masticatory apparatus. This lack of exercise of the jaws and teeth induced weakness of structure, and laid them liable to the disintegrative processes of fracture and decay. Up to the time of Goodsir, naturalists, students of anatomy, physiology, pathology and therapeutics, and medical practitioners, knew next to nothing of the embryological evolution, arrangement, succession and significance of the human teeth. By reason of this unseemly neglect, and ignoring of this important study in medical schools, a sort of empirical observation and study arose, in the main by men unlearned in professional matters, consisting of barbers, hair-dressers, shoe-makers, blacksmiths and others, who became the extractors of aching teeth. In course of time the people discovered that the loss of the teeth entailed debility and disease, in the various forms of indigestion and its concomitants, and thus was laid the foundation of artificial substitutes for the lost natural organs, in hope of mitigating the sufferings of dyspepsia, so prevalent among those who had lost their natural teeth. And thus a new branch of the healing art took its rise out of human necessity, which is fast becoming the divinest practical blessing to civilization in modern dentistry.

At first, substitutes for lost natural teeth were resorted to by ladies, for æsthetic reasons, who had lost upper front teeth. These were made of white wax, and only worn at parties and in society. Next, natural teeth were grafted on to natural roots of upper front teeth; these proved serviceable in eating, and could be worn constantly. At length, transplanting straight rooted teeth was resorted to, which fell into disuse because of the transmission of disease in some unfortunate cases. Then substitutes, carved of ivory to replace one or more teeth, came in vogue. And then porcelain teeth, of crude form and color, were attached to metal bases of wire and plates so formed as to take hold of such natural teeth as remained in the mouth, and were made use of with greater success than anything yet devised. Then entire sets were made, sometimes of ivory blocks, and sometimes of human teeth, on metal plates, and kept in position by spiral springs so attached to both upper and under pieces as to continuously press them against the gums and keep them in place. These were much resorted to for a long time; in fact, are in use in Europe to some extent still. The next advance was the introduction of what is called "continuous gum" sets, which consist of porcelain baked upon platinum plates, so as to represent the teeth and gums in an admirable manner. These are little used, and have never met the favor they deserve. Porcelain blocks led to continuous gum, and this to a fluxing of a very low grade of porcelain, or rather porous glass, around single and block porcelain teeth, with and without gums to constitute a plate or base for the teeth without using platina or any metal. This process was called by the name of the patentee, "Satherthwaite." In turn, a modification of this was introduced as an entire porcelain base, all made at the same carving, of a really porcelaneous body. This has never met with much favor among dentists for many reasons: among which are difficulty of securing accuracy of fit and want of naturalness in appearance and feel to the wearer. Patients say it is too much like "crockery," and annoys them by "clicking" together in the mouth. (Satherthwaite, Loomis and Wright, Dunn, etc.) And now, the bane of patient and dentist made its advent in the shape of vulcanite as a base for artificial substitutes for the natural teeth. The execrable stuff met with favor of dentist and patient to such a degree as to nearly exclude from general use all other forms of base. Celluloid next came before us and had many advocates, but has not and cannot displace rubber for two reasons. First, it is a non-conductor of thermal and nutrient currents, like rubber; and, Second, it requires

more tact and skill to make, besides lacking the durability of rubber. These are both detrimental to health, principally on account of their non-conducting properties—thus heating and scalding the membrane over which they lay, changing the secretion of normal mucous to pus by inducing an inflammatory process by which the nerves of sensation and circulation become paralyzed, instigating loss of tone to the gum and bone covered by these non-conductors of nutrient, thermal and galvanic currents, so essential to taste and to the healthy nutrition of the soft and hard parts of the jaws. The stealthy and insidious manner in which such wide-spread mischief is brought about makes it imperative to direct attention to it in such terms and with such persistency as to arouse those who prescribe and make, and those who wear these noxious bases, to carefully examine into the matter. In the times of ignorance, such sins as commending the use of and providing these inevitably injurious substitutes for natural organs may be winked at in comparative innocence ; but so soon as attention is called to the facts in the case, it is no longer *venial* to continue the habit, but a *crime* perpetrated through the weakness or wickedness of those who persist. To be able to calculate probabilities, it is necessary to be acquainted with the underlying principles involved in any subject. But in the supplying of means of protection to the body from evil, or remedy where evil has already done some of its work, the duty of those who attempt preventive or redemptive procedure is enhanced to the highest degree of moral responsibility.

Such has been the advance in the knowledge of the principles and practice of dentistry as to make it no longer excusable in those who engage in it to plead ignorance of the effects likely to follow upon the adoption of means and methods in their practice. When we wish to protect the body from the effects of low temperatures, we wisely resort to non-conducting material for clothing to economize the heat of the body so necessary to the full circulation of the fluids upon which it is sustained in good working order. But whenever we are under the necessity of supplying artificial supports or substitutes for the lost tissues and organs or parts of organs, as in examples of surgery in supporting displaced organs and in supplying lost parts, we must use such materials as are most nearly allied in conductivity to the tissues themselves, so as not to interfere with the complete play of the fine currents which constitute the true physiological actions of the body in respiration, circulation, innervation and nutrition. Bases for the support of artificial teeth hold a mid-way position between cloth-

ing and substitute for lost parts. In so far as mucous surfaces are covered, the secretions of mucous and normal nutrition are interfered with to a greater or less degree, in accordance to the non-conducting or conducting qualities of the material of which the base is constructed. Moreover, the conductivity may be so much higher than that of the tissues in some of the noble metals as to render bases made of these objectionable to many nervous and hypersensitive constitutions. There is no constitution, however, in which non-conductors, such as rubber and celluloid, will not work mischief and destruction, especially when continuously worn in position day and night. Whenever any tooth in the arch (except the wisdom teeth or third molars) is lost, it should immediately be replaced to avoid mal-occlusion of those adjoining it. Hence, all roots of teeth should be preserved, when they can be rendered healthy, upon which to insert artificial crowns, be they incisors, cuspids (eye teeth), bicuspids or molars. In case roots cannot be rendered firm and wholesome, they should be removed at once, before the adjoining teeth are forced from their true position in the arch. In such cases, artificial crowns, with or without gums, should be set, to complete the cordon of masticators and thus keep up the support so necessary to efficient use of these transcendently useful organs at the very head of the digestory apparatus.

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A combination of noble metals with tin has been discovered and perfected by which results heretofore unattainable can be had, in a very feasible way and in short space of time, by following out the steps of the process just referred to, which has been laboriously experimented upon and proved in so demonstrable a manner as only needs to be seen to be approved by the earnest and intelligent practitioner of the art of supplying artificial substitutes for lost parts of the masticatory apparatus. Completeness of organization is necessary to completeness of the performance of function, and therefore the more nearly we can approach the perfection of the masticatory organs, the nearer we come to perfect digestion of the food upon which we live. When we shall have learned that evil usually comes upon us in

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The one paramount question respecting substitution of artificial fixtures for natural structures, is concerning the character of the healed, or scar-tissue, which must be obtained, upon which or against which the artificial appliances are to rest. This is the department above all others of which little is known. The differences between the reproduction of tissues in normal nutrient activity and that resultant upon reparation from traumatic or functional lesions, has not been exhaustively studied. Yet every physician, surgeon and dentist acts upon the assumption of knowing just what to do in the cases he treats.

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possibility of the formation of a certain amount of nitrate of lime is probable, at the outside of a decaying mass where the influences of oxygen and perhaps even ozone are powerful, the process of the progress of decay under a layer of half disorganized organic substances protected against the oxygen from without, etc., is not well referable to that oxidizing influence. Besides, we are not acquainted with results proving the actual formation of nitrates in decaying teeth. The proving of a possibility does not prove a fact, and a theory cannot be based on a possibility, but must be based on a fact. If we put teeth in hydrochloric acid, and they are dissolved, Dr. Watt asserts that the acid is "quiescent." How does the acid know that it is "quiescent?" Simply because Dr. Watt uses that really beautiful word; we cannot associate any idea whatever with the word. The acid always attacks most actively the tooth, just as lively as if it was nascent, or evanescent, or opalescent. Such words do not prove or disprove any thing. Dr. Watt found great fault with the statement that "acids alone do not destroy living tissue," and thinks sulphuric acid, etc., do destroy it. Surely they may, but they may not, too. Dr. Watt himself is too familiar with the many prescriptions of diluted nitro-muriatic acid in diseases of the liver, of diluted sulphuric acid in hemorrhages, etc. They do not destroy the tissue. This depends on two conditions: nature of acid and concentration, both of equal value.

As the New England Journal of Dentistry has taken a most decided ground in that question and does not care to foster a pet theory but to try, if we are able, to prove one theory by giving it our full and warmest support, we are ready and have to meet all the possible objections. Let us have no misunderstanding about our standpoint. What does it matter to an outsider, like Prof. Mayr, whether teeth decay by acids or germs? or how does a wrong theory help practical men? No one of us has the slightest interest in maintaining a wrong theory. We are as honest in searching for the truth as Dr. Watt; but only by giving a certain theory all the support possible, and fighting the objections line for line, will it be possible to determine the truth. If we are beaten no harm is done; only good comes from it; we will approach nearer the truth. By half accepting one theory, half another, and not knowing or understanding either, no good will be done. Let one consistent theory be put up, let us fight for it with all our power, and, when beaten, accept another consistent theory. But let us not float about in haughty indolence, indifference and ignorance. A theory will be needed to give a guidance in treatment, to give us the

satisfaction that we are more than men who plug up holes in teeth with gold, etc. If we have nothing to answer our inquiring patients but an indolent "I do not know," we will not stand very high in their estimation, and in that of our fellow workers in other branches of the medical sciences. We like Dr. Watt and his theories and statements much better than all the guarded statements of "lions" in dentistry, who think their real or imaginary dignity suffers, if they commit themselves to a theory. We generally can see what he has to say. He does not often talk cheap commonplace.

The experiments of Dr. Uskoff are arrayed against the theory of germ diseases. But Dr. Uskoff's experiments only prove that *suppuration* is not due to the presence of germs; but suppuration is nothing but a transformation of the tissues of the bodies into their embryonal state, and no germ affection, as it has been proved almost conclusively by the followers of Dr. Carl Heitzmann in his excellent book. Between suppuration of tissues and necrosis of tissues there is the same difference as between croup and diphtheria, which, though resembling each other very much in their macroscopical aspects, are due to entirely different causes, and are very different in their clinical features. Without doubting for a moment the ability of Dr. Uskoff, it is simply again one of the cases that "do not apply." Dr. Watt must have odd ideas of microscopic organisms, if he says that "though not claiming to be an expert with the microscope, he could see a June-bug or a beetle if in full view." With that "if," Doctor, you never will see a microscopic organism, if you want to see them as large as these insects. While the experiments of Dr. Watt and Prof. Wood will never be questioned, they prove but very little.

The greater part of the dabs of Dr. Watt at some of our editors we can pass over in silence; they belong to the funniness to which unfortunately now and then Dr. Watt yields too much. We repeat again, what was said in one of our former numbers, not the years of work are the point in question, but who is right or wrong. That young sprig, Napoleon I., not more than 26 years old, drove before himself, with his ragged army, men with forty years of study in the military sciences. Dr. Watt gives an excellent specimen of his logic in the following passage:

"Now, for the present, assume (!!?) that white decay is immediately caused by nitric acid, and that this acid is formed by the oxidation of ammonia. As ammonia is composed of nitrogen and hydrogen, its oxidation results in nitric acid and water. Liebig and other author-

ities state that it is always thus oxidized in the presence of free oxygen. And if it was in Liebig's day, it is now. Remember, too, that ammonia always results from the putrefaction of nitrogenous organic compounds. Suppose an atom of nitric acid has got through the enamel—not through the hole that Mayr's bug goes in at—but through a defective spot. It acts on the dentine—faster on the lime than on the gelatin. A thin layer of the lime-salts is dissolved, and of course, a thin layer of organic matter is left. By putrefaction it gives ammonia, to be oxidized into nitric acid. to dissolve more lime, and expose more organic matter, to putrefy and give more ammonia, to be oxidized into more nitric acid, to dissolve more lime-salts,—and thus, on and on, till the pulp cavity is reached. Such is white decay."

There is hardly a sentence that is not full of chemical sophistry, suppositions, hypotheses and things that do not apply. Dr. Watt leads the "calm, old President of a Theological Seminary," that real handy person, against modern science in general, in the following passage:

"A President of a Theological Seminary was asked by a somewhat alarmed pupil if he thought that Christianity could stand up against the present teachings of science. The calm old President asked: 'What are the present teachings of science? I have not read the dailies this morning.'"

The pupil asked a silly question, no joke about that, but the man who gave that answer was either a consummate ass or one of those haughty, ignorant, self-made demi-gods who fancy themselves to stand between God and the human rabble. If he expected to see real science in the "dailies of the morning," he never knew what science was; they would not print it, because it would be too dull to the great mass of the readers. What they print are speculations; the better, the more startling or improbable, and it is a very common sophistry among pious ostriches who wish to keep their heads in the sand, to lament about the changeability of science, while they never yet knew what it was or claims to be. Because they will tell you, in a few minutes, to their own satisfaction, the whole receipt of their creed in childlike, bland words and dreamy parables and comparisons, they are unable to realize the depth of real science, which fills a man's deepest soul with a lasting, never-fickle love of truth rather than of the happiness of people afflicted with progressive paralysis. We hope to hear less of the wondrous sayings of that "calm old President." Dr. Watt in his worst, when talking about ammonia being oxidized into the nitric acid in the mouth, says much better things than he.

The *Ohio State Journal* for January, 1883, contains as first article the very good paper of Dr. T. W. Brophy, of Chicago, on caries and necrosis of the bone. He does not go into deep theoretical speculations, but shows from cases illustrated that, for carious bone, the only treatment with any success was to scrape off the affected portion of bone, while in necrosis the only help was to let the sequestrum be formed completely, and then to remove it mechanically.

In an elaborate article, Dr. G. V. Black, of Jacksonville, Illinois, speaks of phagedaena pericementi. The paper was written in consequence of an invitation to write about Riggs' diseases. He says: "My notions of this disease have long been at variance with those held by the profession." He attempts to prove that the chronic destructive diseases of the alveolar dental membrane is not always dependent upon calcareous deposits for its origin, and distinguishes between cases which arise from the presence of salivary calculus, and others, similar to the first in other respects, which do not arise from this source. This second form of the disease he calls phagedaena pericementi, or phagedaenic pericementitis. He considers this disease an infectious chronic destructive inflammation of the alveolar dental membrane, by which that part is destroyed, cell by cell, fiber by fiber, similar to the process of caries. No considerable inflammation of the gums is necessary; in the simpler forms the disease is strictly limited to the alveolar dental membrane, beginning at its gingival margin; first, a red line appears at the borders of the gums. The author thinks this line a constant first symptom, which disappears, as the disease advances. After the red line has persisted for some time, close examination will discover that the margin of the membrane is decayed, so that a thin flat blade will pass down the root farther than it should do. The destructive process gradually extends towards the apex of the root, forming in most cases narrow, deep pockets. This may occur at only a few points around the root. If the disease attacks only one side of the membrane, the position of the tooth will be altered; it will move away from the diseased parts. In many cases the gums do not recede from the teeth at all, as in the case of calcareous deposits. In a number of cases Dr. Black has observed a distinct thickening of the gingival margin of the alveolar process in the early stages of the disease, which he thinks to be due to a bony deposit. In many cases with gums apparently perfectly healthy, the disease seems to be more rapid and destructive than the one accompanied with the deposit of calculus. Though cases without calculus are quite numerous, the greater

number of cases has been accompanied by calcareous deposits. The calculus deposited from the serum of the body, he calls "serumal calculus," forming the incrustations on foreign substances imbedded in the body. To distinguish the purely phagedaenic pericementitis from the destructive affection produced by calculus, the author thinks the pockets and presence of a fungus as indicating the first, and not the latter. He considers the fungus found in the pockets as pathological, and that the disease therefore is infectious. A transportation from mouth to mouth by the instruments of the dentists, he thinks probable. He considers it curable, though with difficulty. If the infectious character of the disease is true, it would add another one to the list of the numerous "germ diseases" with which dentists have to deal.

The action of the Brooklyn Dental Society in taking up the subject of the "Etiology of Dental Caries," and devoting a series of monthly meetings to its consideration, seems to us a wise one. Having made the "germ" theory the subject of investigation for the two previous meetings, we understand that at the next, which occurs on the 12th of February, they take up the "chemical" view, as presented by Dr. Watt in the January number of the Ohio State Journal. No more important subject can engross the attention of the whole dental profession than that which relates to the *causes* of that which the profession are endeavoring to alleviate and prevent. How can "treatment" be intelligent that is based upon an incorrect or superficial diagnosis or theory of causes and conditions? The degree of *exactness* in the apprehension of facts constitutes the difference between the scientific and empirical. A whole winter may be well spent by the Brooklyn Society, or any other, in the study of this question; and it must be studied from all sides in order to arrive at an impartial and other than narrow view or theory. In the study of this question there is much *sifting* necessary in order to separate *theories* from *facts*—the "*Maybes*" from *what is*. In this regard we are aided very greatly by the investigations of our reliable microscopists and chemists. Facts from these two scientific sources go a great ways towards the establishing of a reasonable theory, especially when the revelations from each harmonize so thoroughly as they do, and, also, with the common observation of every day practice. It is these *facts* that we need to seek out and firmly fix in the mind; after this is done *theories* will follow necessarily with every intelligent, philosophical mind. What

we need to be most careful about is the *facts*—and in the search for these we must lay aside all bias and preference, that may easily be misleading. We trust the example of the Brooklyn Society may become contagious.

Dr. Marshall Hickman Webb died January 1, 1883, at 5 A. M., at his home in Lancaster, Pa., of cancer of the colon, from which he had suffered terribly, at times, for two years previous to his death. He was born at Marlsborough, Chester County, Pa., October 28, 1844, making him 38 years of age. He studied dentistry with Dr. Frank Hickman, of Coatesville, Pa., and was graduated by the Philadelphia Dental College in 1867, and has practiced in Lancaster ever since, where his great skill in operative dentistry and his thorough knowledge of surgery soon gained for him a very extensive practice, and brought his name prominently before members of the dental profession. He was a member of the Harris Dental Association of Lancaster County; of the State Dental Association (Pa.), and the American Dental Association. He held the position of Lecturer on Operative Dentistry and Dental Histology in the Dental Department of the University of Pennsylvania. He attended the International Medical Congress held in London, 1881, before which body he read a very able paper upon "The Restoration of Contour the only way to Keep the Margins of Proximate Surfaces of the Teeth Permanently Separate and Prevent Recurrence of Decay." He also gave demonstrations of his very superior skill in operating, using the electric mallet, the construction of which he had improved very materially by inventions of his own. Among his professional brethren he was regarded as one of the brightest and most thoroughly scientific members of the profession. Although wasting with a painful disease, Dr. Webb still had the elevation of the standard of dental operations at heart, and while confined to his bed wrote a work on operative dentistry, which is now in press, and shortly to be published, by The S. S. White Dental Manufacturing Co., which will be an enduring monument to the memory of this superior man. Dr. Webb leaves a wife and three children and our whole profession to mourn his untimely death.

"Cohn estimates that one bacterial rod, under favorable circumstances, will produce 281,500,000,000 in forty-eight hours; and that, were it not for the unfavorable circumstances incident to its situation, it would fill the ocean in five days."—*Popular Science Monthly.*

It was once the misfortune of an old Irishman whom we knew, to be brought before the police court, charged with some slight misdemeanor. After the indictment had been read to him with all due legal formalities and solemnities, he was called upon to "plead," which he did in this somewhat unique manner: "Well, your Honor, I am guilty some, but not as guilty as that paper reads." This pleading of the honest old Irishman we feel like appropriating regarding the late delivery of our January number of the Journal. We were several days later than usual in mailing this number, but several days thereafter we ascertained that they had not been distributed and sent on their way by the insufficient force at our local Post Office. We were "guilty some," but not as guilty as the lateness of their arrival at various destinations might indicate. While the country might be benefited to some extent by a reduction in letter postage to two cents, it would seem that there are some offices, at least, that would be benefited were the department to accord a larger force to cope with the increasing demands of business. We suspect, by the way, that our local office is not alone at fault in this respect, as most of our exchanges came to hand after our number was mailed. Holiday packages would probably be the assigned reason for this delay at "headquarters," but if the government assumes this merchandise mail carriage business, it would seem that their facilities should be made equal to their undertaking, so as not to interfere with the more legitimate and regular business of the department. To be fair, however, we will say that we have not had occasion to find fault before.

Those who have had the pleasure of meeting the late Dr. Webb, and the larger number who never saw him, but have nevertheless felt the influence of his noble devotion and disinterested services in behalf of the profession, will be saddened by the intelligence that *because* of this devotion and service, he has left his family, a widow and three children, unprovided for. Every one who knew him must admit that had he been less unselfish and had he given less of his time and strength to the general good of the profession, he might have left a competence to his now bereaved family if, even, he might not have saved his life for years yet to come.

We refer to this because a testimonial fund has been proposed by several dentists who feel their obligation to him, and have voluntarily expressed a desire to contribute generously to such an object.

Arrangements have been made whereby Dr. J. W. White, editor of the Dental Cosmos, will act as treasurer and gladly receive and acknowledge any subscriptions which may be sent as a token of sympathy with the family and appreciation of Dr. Webb's valuable and unselfish work. The mere announcement of this project ought to be enough to insure a large fund. How much do you *owe* Dr. Webb?

The editor of the Journal of the British Dental Association has kindly sent us advance sheets of a very valuable paper by C. S. Tomes, M. R. C. S., F. R. S., etc. Subject, "On Some Scientific Problems of Dental Surgery," read at the late annual general meeting of the British Dental Association.

Our space this month will not permit its production in our columns in full; consequently, we defer it until the March number.

SOCIETIES.

CONNECTICUT VALLEY DENTAL SOCIETY.

[Conclusion of Report.]

MORNING SESSION—*Second Day*, Oct. 27, 1882.

SECTION 4.—Dr. Parmele, chairman, reported the following cases:

CASE OF NECROSIS.

Johnnie F., of Irish parentage, and of scrofulous diathesis, about five years of age, was brought to me by his mother, who desired me to extract the right inferior second molar to relieve pain which he referred to that tooth. Examination with a mirror showed the surrounding parts congested and highly offensive, but the tooth complained of was so slightly attacked by caries as to show at a glance that it was not the cause of the trouble. Traction upon it, however, showed it and a portion of the adjoining bone quite loose and free from the maxilla. After making a slight incision, I was able to gently lift out the exfoliated portion, which I pass around for your inspection. It will be observed that the germs of the permanent bicuspids are in the sequestrum, but on examination of the boy's mouth at the present time (it being now about seven years since I first saw him), shows the permanent canine also missing, the germ of which occupied

the space where the most active inflammation seems to have been. Owing to ignorance of the mother, the history of the case is rather meager, she not being aware of any trouble until a day or two before calling on me. I am inclined to think, however, that the trouble resulted from a blow which the boy says he received about a year before. The only after-treatment required was thorough cleansing with carbolized water, the parts healing quickly.

EPULO-FIBROID TUMOR.

Miss De S——, aged 20, was referred to me Feb. 6th, 1877, on account of an epulo-fibroid tumor of the right superior maxilla. Her family dentist who, by the way, is quite skillful as regards the purely mechanical part of dental treatment, had no idea what it could be. The upper lip was considerably protruded. Examination of the mouth showed a tumor slightly pediculated, five-eighths of an inch in diameter, attached by a broad base half an inch above the margin of the gum, over right superior incisors, and having a granulated surface. This tumor was first noticed about a year before, and had since gradually increased in size. A casual glance at the incisors revealed nothing abnormal, but careful examination showed a slight darkening of the left central. This tooth, the patient stated, had never to her knowledge been treated as far as the pulp cavity was concerned, but when an attempt was made to excavate on its distal surface two or three years before for a small filling, it was so sensitive that the dentist said he would put in something to make it less so. A few days later it was painlessly excavated and filled, since which time she had experienced no pain. Pressure over all the incisors caused pain. I advised opening from its palatal surface into the pulp cavity, which, being done, a large quantity of offensive pus was liberated. With a small probe I discovered a free opening through the root. Thoroughly washing out the parts and making antiseptic applications, I dismissed the patient for a week, when the tumor was to be removed.

Feb. 16. Ether having been administered by an assistant, I thoroughly removed the tumor by an elliptical incision carried well back into healthy tissue. Finding the exposed bone carious from this point over to the left central, it was deemed advisable to extract that tooth, which was done, and all carious bone removed. Through cleanliness obtained by the use of a solution of carbolic acid, gtt. x to ℥i of water, and a week's time, completed the cure. Six months ago there had been no reappearance of the growth, although at times,

from uneasy sensations in the parts, the patient feared there might be. I have regretted the loss of the tooth, and have often questioned whether, in a similar case. I should extract; but, taking everything into consideration, I consider it the safer course. Garretson* says of these tumors:

"By treating them with the latitude given to carcinoma, nothing detrimental to an innocent growth is done, but everything in the way of cure possible (with our present knowledge), should the disease be malignant."

At any rate, here is the tooth for your inspection. This case illustrates two points which all reputable dentists are supposed to know:

1. That arsenical paste is not a safe application for sensitive dentine. (I take it for granted that arsenic was applied, although I can not assert its use.)

2. That in order to be a competent practitioner of *dental art, even*, something more than a mere mechanical knowledge is necessary.

PERIODONTAL ABSCESS INVOLVING THE ANTRUM.

Mrs. C. W. H., aged 50, was referred to me, Sept., 1881, by Dr. C., for treatment. I found the left superior canine with its crown missing, and the root loose from chronic periodontitis. The bicuspid and first molar were missing, and half an inch above the margin of the gum, at a point formerly occupied by the second bicuspid, a fistulous opening was discovered which, upon probing, was found to lead to the antrum. Removal of the canine root was followed by a slight discharge of pus, and a probe passed into its socket also entered the antrum. Surrounding each of these openings was carious bone—greater in amount, however, at the canine opening, where the maxilla was dissolved away for a space half an inch in diameter. Having thoroughly removed all diseased bone with bone-cutting burs in the dental engine, I then, by means of a small tube attached to a fountain syringe, allowed about a pint of warm salt water to flow into the antrum at the anterior opening, which made its exit at the posterior opening. By changing the tube to the posterior opening, I reversed the current, thus insuring thorough cleansing of the sinus. This was followed by this injection:

℞. Eucalypti (Sander's Sons), ℥i;
Iodeformi, gr. x;
Aquæ, ℥i.
M.

* Page 812; third edition.

And a tent of candle-wicking, saturated with glycerine and eucalyptus, was passed into the antrum at the anterior and brought out at the posterior opening, where the two ends were tied together. A few days later, floss silk was substituted for the wicking. This treatment continued a week, when the tent was omitted, and the patient being instructed, from that time kept the parts clean herself. In a month after, a few stimulating injections:

℞. Zinci sulphatis, gr. iii;
Rumbi acetatis, gr. v;
Tincturæ catechue, gtt. x;
Aquæ, ℥i.
M.

The parts had regained their normal condition, and the openings gradually healed.

The cause of this trouble seems to have been an abscess on the root of the canine tooth, which had worked its way into the antrum and given trouble more or less for about five years. At one time an abscess had pointed, and was opened where I found the fistula above the site of the second bicuspid.

The use of the fountain syringe for thorough cleansing of the antrum I find very useful. I have never seen its use for this purpose mentioned; nevertheless, it may be an old idea, though new to me. It certainly cleanses the antrum thoroughly and is more easily managed, either by operator or patient, than any other form of syringe.

Discussion.—Dr. SHEPARD wished that Dr. Parmele would speak more at length upon the use of eucalyptus.

Dr. PARMELE: I generally use an extract of the leaf, prepared by Sanders & Son, of Australia. I don't use iodoform much, dissolved in ether. When I do, I add it to eucalyptus, and let the ether evaporate. I use eucalyptus in the treatment of devitalized teeth, and just as I get it—full strength—excepting where it is to be used as an injection. Then I dilute it.

Dr. ATKINSON: My experience has been similar. I had a young man, who was a great smoker, come to me with an abscess of the root of one of his centrals. I used it full strength through a sinus, and a slough resulted. I had supposed that eucalyptus was not an escharotic, but in this case it might have acted deeper, owing to debility from nicotin.

Drs. Shepard, Abbott and Bartholomew related experiences with and treatment of cases of abscess and necrosis, Drs. Searle, Miller

and Niles participating in the discussion. Following this, Dr. Shepard exhibited methods of preparing and holding sand-paper disks. The ingenious device for holding them ready to hand for use, and the remarks of the doctor upon their very general application in the treatment of decay, was greatly appreciated.

SECTION 5—Paper by Dr. Atkinson (found elsewhere in this number). Owing to the lateness of the hour, this paper was not fully discussed.

Dr. Shepard spoke in praise of Dr. Heitzmann's "Microscopical Morphology," Tyndall's "Floating Matter in the Air," etc.

After President Morgan had been duly installed, and had thanked the assembly in a few well-chosen words for the honor conferred, he appointed the following committees:

Executive Committee.—Drs. S. B. Bartholomew, Geo. M. Parmele, A. J. Nims.

Section Committees.—1, S. E. Davenport; 2, C. T. Stockwell; 3, E. S. Niles; 4, L. D. Shepard; 5, C. F. Bliven.

Dr. Frank Abbott was elected to honorary membership.

Voted, That the place of next meeting be selected at the discretion of the Executive Committee.

Adjourned.

SELECTIONS.

In our May (1882) number, we published an article that was read before the International Medical Congress, by Arthur S. Underwood, M. R. C. S., L. D. S., and W. J. Milles, F. R. C. S., on "An Investigation into the Effects of Organisms upon the Teeth and Alveolar Portions of the Jaw." In the November number, Dr. Stockwell also made quite extensive extracts from the same article. The *subject* of this paper being, seemingly, the *live* question of the day, we have thought it advisable to quote from the official report of the Congress the discussion in full that followed the reading of this interesting report by the above-named gentlemen. The italics are our own.

Dr. TAFT, Cincinnati: The experiments detailed in the paper just read are very interesting indeed, and are fraught with instruction for all; but they can hardly be regarded as accounting for the production of caries of the teeth. The conditions that attend and surround the

teeth in the mouth cannot be simulated nor imitated artificially. The experiments here given were conducted under a uniformity of conditions that is never found, and does not exist. The temperature in the mouth is ever varying; the substances in the mouth are changing constantly and the agents produced by their decomposition or fermentation will be various, and subject to constant change. The agents producing decay are subject to change, both in kind and degree. In the mouth there are ever present substances that will produce coloration, more or less marked, and various in kind. In regard to parasites, I do regard them as active agents in dental caries, and not a cause, but a result, of decay; they are not a primary, but a secondary element in the process. The cause of dental decay must be sought in some other direction, of which I will not speak.

Dr. DENTZ, Utrecht: It appears to me that the experiments carried out by Messrs. Underwood and Milles, although exceedingly interesting, nevertheless lead to results identical with those obtained by Leber and Rottenstein, whose conclusions have already been sufficiently controverted by, amongst others, Messrs. Wedl and Tomes.

Mr. C. S. TOMES, London: In answer to the suggestion that the paper before us has been anticipated by older writers, and that it is inconclusive, I may be permitted to point out wherein it appears to me that the especial value and the thorough originality of the paper lies. Caries has been produced artificially many times, and by many observers, but with no special thought of septic agencies taking any part in the process; consequently, they have always had their full fling. Mr. Underwood and Mr. Milles have shown, by many experiments, *that the other conditions remaining precisely the same, in an aseptic flask caries never occurs; in a septic flask, it always and speedily occurs.* Whatever interpretation we may put upon this, it remains as a fact, contributed to our knowledge of the artificial production of dental caries, which can never be left out of consideration by any subsequent observer or writer on the subject.

Mr. WALTER COFFIN, London, described a treatment of extensive alveolar abscess by the evolution of oxygen rapidly, within the sac, by the injection into it of peroxide of hydrogen, forming with the secretion a thin froth, and strongly distending and thoroughly evacuating it. There is a complete antiseptic disinfection without coagulation.

Mr. COLEMAN, Streatham, said that the interesting and valuable paper they had just listened to was—whether it should lead to the adoption of the views of the writers or the rejection of their opinions

—still a step, and a valuable step, towards our knowledge of the conditions or complications which are to be met with in the affection termed dental caries. There was this difference, that in the one case —in the mouth—the affection occurred in structures closely connected with living tissues, which was not the case in the artificial experiments. Mr. Coleman further said it would be very interesting could they follow out the ultimate results of abscess cured by antiseptics. He had thought the matter much over, and considered it probable that the part so treated might assume the condition of the carbolized catgut. If so, it was more than probable they would undergo the same changes as the latter did when introduced into the body, viz.: to become gradually absorbed, and have their exact place supplied by new and healthy tissues.

Mr. S. I. HUTCHINSON, London, thanked Mr. A. Underwood and Mr. Milles for their most valuable labors, and believed they had got in the right groove for elucidating the action and cause of caries; but he must protest against the threatened abandonment of the term "dental tubules." The authors admitted that there were fibrils, that these fibrils ran in channels in the calcified tissue of the dentine; then, why should they be so ready to give up calling those channels, tubes? Mr. Hutchinson then read an extract from Dr. George Harley's paper in the Pathology Section, which went far to confirm the authors in their views. He says that "all disease germs tend to produce local as well as constitutional disturbances."

The debate was continued by Mr. SPENCE BATE, Plymouth.

Mr. A. S. UNDERWOOD, London: I have very little to add to Mr. Charles Tomes' speech, by way of reply. He has expressed my idea of the scope of my paper more clearly than I could have done myself. Dr. Taft has asserted that germs *are not primary*, but *secondary*, causes of caries; this assertion I must meet by simply saying that *they are never secondary, but always primary*. One assertion carries probably as much weight as another. Both Dr. Taft and Dr. Atkinson have misunderstood the drift and scope of my paper. We did not profess in the short space of twenty minutes to give a succinct account of the ultimate and elementary causation of everything connected with the teeth. The allotted time is scarcely sufficient to discuss the effects of germs, and we had no desire to enter into any other questions. Dr. Taft must remember that the varieties of caries are just what we should expect from the varieties of the germs, hundreds of different forms having been already demonstrated. Dr. Atkinson asks me what "sep-

ticism" means. In England, we understand it to mean a condition in which germs are present. He also complains of the use of the terms organic and inorganic. I can only say that we are obliged to employ these terms in their ordinary sense for simplicity's sake. Mr. Hutchinson asks an important question, afterwards repeated by Mr. Spence Bate, why are bacteria more lively now than two thousand years ago, when decay was less rife? I answer that we are all more lively ourselves; we eat things and drink things that are not good for our enamel, and we contract diseases, traceable to civilization, that are not good for the enamel of our children, *and thereby give the bacteria an opportunity to employ their energies on the weak points.* Our progenitors ate simpler food and lived more simply, and therefore their enamel was better, and the progenitors of the modern bacteria had no chance of showing what mischief they could do. The primeval micrococci that dwelt in Mr. Bate's primeval skull were as powerful as those that swarm in the mouth of a modern dog (and even dogs are beginning to have decay now). I must heartily thank Mr. Bate for his clear and candid criticism. I hope he will investigate what we have said; we shall do so ourselves. We do not take it for granted or blindly believe it a bit more than you do, and if our further researches disprove it we shall be the first to say so. We quite feel, with Mr. Bate, that it would have been more satisfactory to have enlarged at greater length upon our experiments; but there is plenty of time before us for that, and we promise to do so. Do not expect too much all at once; we had an embryonic theory, and as you had a Congress, we determined to broach it to you. Of course, time alone can establish it, but we cannot give you a new theory, and, at the same moment, one sanctioned by time. Our bantling is in his cradle; we must wait to see what he will grow up to be. Dr. Dentz has also paid us a compliment I cannot pass over, in coupling our names with those of his distinguished countrymen, Leber and Rottenstein. I must, lastly, thank Mr. Charles Tomes for his clear exposition of our views. I do not think you have heard the last of them, and I confess to a suspicion that our endeavors to convince our very candid critic, Mr. Spence Bate, will be crowned with success; and I am sure that if we can prove our point to his satisfaction, he will be the first to confess the fact. One thing I think you will all agree upon, that, whatever the merits of the paper, it has produced a very animated discussion, for which, in the name of my colleague, Mr. Milles, and myself, I heartily thank you.

BIBLIOGRAPHICAL.

CARIES AND NECROSIS OF THE MAXILLARY BONES. By Truman W. Brophy, M. D., D. D. S. A paper read before the Illinois State Dental Society.

The following "*Resume*" will give a general idea of this valuable paper, for which the author has our thanks:

"To avoid the diseases described, first, always remove loose, valueless roots that cannot be made useful by crowning. Second, always avoid the use of cotton or other material in the filling of roots which will absorb moisture, or admit fluids within the canals, since from these fluids emanate the gases which cause the inflammations that most frequently lead to diseases of the bones hitherto described. Third, never remove a tooth or root, even though the apex is standing up in the carious bony cavity, provided the periosteum intervening the carious cavity and the alveolar border be not dead. This exposed point of the root may be excised, the pulp canal filled, the carious bone removed, and the tooth restored to usefulness. When chronic alveolar abscesses do not yield readily to the iodine or carbolic acid treatment, caries, although perhaps slight, very likely exists, and the sulphuric acid treatment should be resorted to. When patients suffering from acute periostitis of the maxillary bones present themselves to us, we should unhesitatingly, and without delay, make numerous and deep incisions down upon the bone and relieve the engorged blood vessels."

DIAGRAM OF AN INCISOR TOOTH. Mailed in paste-board roll to any address. Price $1.00. The S. S. White Dental Manufacturing Co.

This beautiful illustration of the minute structure of an Upper Central Incisor was published under the direct supervision of Professor Frank Abbott, M. D., and by special request of the Dental Society of the State of New York. The object was to give to the dental profession a correct idea of the minute anatomy of a tooth. If not absolutely perfect microscopically, it approximates so closely to nature that it conveys to the mind at once an intelligent understanding of the structure and relations of the organ. The diagram represents a longitudinal section of the tooth. It is 13½ by 9½ inches in size, and is printed in six colors. It shows, clearly, Nasmyth's membrane; the enamel, dentine, cementum aud pulp, with periosteum and socket of

alveolar process, covered by the gum; the blood-vessels and nerves of the pulp; the odontoblasts surrounding the pulp; the direct connection of the non-medullated nerve-fibers with the odontoblasts, and the passing of those fibers between these bodies into the dentinal canaliculi, and the distribution of living matter in almost every direction throughout the dentine, finally reaching the interzonal layer (interglobular space), whence it enters the enamel, to which it is more minutely but as clearly distributed.

We are indebted to Dr. J. A. Robinson, of Jackson, Mich., for several valuable publications, among which are the Transactions of the Ohio State Dental Society for 1881, and the Michigan Dental Society for 1882. Dr. Robinson will please accept our thanks. These reports are especially valuable to editors of dental literature.

CORRESPONDENCE.

Salts of metals prevent decay of dentos.

Dr. F. Y. Clark, whom the Journal quotes in its January number, says: "Solutions of mercuric chloride . . destroy spores in ten minutes. Does not this solve the mystery of the old mercurial fillings inserted over forty years ago, and explain the cause of recalcification of dentures often seen under those fillings?"

The oxides of metals preserve wood from decay. They preserve dentos from decay.

In the January number of the Journal are extracts from Dr. Miller's paper on "Electrical Currents in the Mouth." He says: "I maintain that there exist electrical currents in the mouth, but not between filling and tooth substance." "The conductive power of dry dentine was tested . . not the slightest passage of electricity could be noticed." "When the dentine was moist the moisture conducted the current."

I say, is not the dentine of a tooth in the mouth always moist? Then, what is to prevent the electric current between dentos and metal, unless it is cut off by a non-conductor? Are there not thousands of open end tubes next to every large filling? Are not these tubes filled with moisture? Is not the enamel itself moist?

HENRY S. CHASE, St. Louis, Mo.